

Section 2-3: Conditional Statements

By the end of this lesson, you should be able to answer:

- How do you analyze statements in if-then form?
- How do you write the converse, inverse, and contrapositive of if-then statements?

Define the following:

1. Conditional Statement
2. If-Then Statement
3. Hypothesis
4. Conclusion
5. Related Conditionals
6. Converse
7. Inverse
8. Contrapositive
9. Logically Equivalent

Example 1: Identify the hypothesis and conclusion of each statement.

a. If a polygon has eight sides, then it is an octagon.

b. Matt Mitarnowski will advance to the next level if he complete the Towers of Hanoi in his computer game.

Example 2: Identify the hypothesis and conclusion of each conditional statement. Then write each statement in the if-then form.

a. Measured distance is positive.

b. A six-sided polygon is a hexagon.

Example 3: Determine the truth value of each conditional statement. If *true*, explain your reasoning. If *false*, give a counterexample.

a. If you subtract a whole number from another whole number, the result is also a whole number. (HINT: What is a whole number?)

b. If last month was September, then this month is October.

c. When a rectangle has an obtuse angle, it is a parallelogram.

Example 4: Determine the converse, inverse, and contrapositive for the following statement. Then determine if the new statement is true. If the statement is false, give a counterexample.

If N is the midpoint of \overline{MO} , then $\overline{MN} \cong \overline{NO}$.

Converse:

Inverse:

Contrapositive:

Problem Set:

"DON'T BE DISCOURAGED BY A FAILURE. IT CAN BE A POSITIVE EXPERIENCE. FAILURE IS, IN A SENSE, THE HIGHWAY TO SUCCESS, INASMUCH AS EVERY DISCOVERY OF WHAT IS FALSE LEADS US TO SEEK EARNESTLY AFTER WHAT IS TRUE, AND EVERY FRESH EXPERIENCE POINTS OUT SOME FORM OF ERROR WHICH WE SHALL AFTERWARDS CAREFULLY AVOID." - JOHN KEATS